

CLAIMS:

WHAT IS CLAIMED IS:

1. A method for routing packets among a plurality of node in a computer
5 system, the method comprising:

receiving a first packet at a first node of the plurality of nodes, the first node
comprising a plurality of packet buffers, wherein each packet buffer is allocated to a
particular virtual channel of a plurality of virtual channels and the first packet is
10 received on a first virtual channel; and

storing the first packet in a first packet buffer, the first packet buffer being
dedicated to packets received on the first virtual channel.

2. The method as recited in claim 1, wherein the first packet is a posted request
packet, the first packet buffer is a posted commands packet buffer, and the first virtual
channel is a posted commands virtual channel.

3. The method as recited in claim 2, further comprising:

receiving a second packet at the first node;

determining a second virtual channel on which the second packet is received; and

5 storing the second packet in a second packet buffer based on the determination of the second virtual channel, wherein the second packet buffer is different than the posted commands packet buffer if the second virtual channel is not the posted commands virtual channel:

10 4. The method as recited in claim 3, further comprising:

determining a destination of the second packet; and

15 if the destination is a second node other than the first node, the second node comprising a second plurality of packet buffers, each of the second plurality of packets buffers being allocated to a particular virtual channel of the plurality of virtual channels, then

20 determining availability of one of the second plurality of packet buffers allocated to the second virtual channel; and

transmitting the second packet to the second node based upon the determined availability.

5. The method as recited in claim 2, wherein the posted request packet comprises a posted write packet specifying a data packet including corresponding write data.

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6. The method as recited in claim 5, further comprising:

receiving the data packet at the first node; and

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storing the data packet in one of the first plurality of packet buffers which is allocated to the posted commands virtual channel.

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7. The method as recited in claim 6, wherein the first plurality of packet buffers comprises command packet buffers and data packet buffers, wherein the posted commands packet buffer is one of the command packet buffers, and wherein the data packet is stored in one of the data packet buffers.

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8. The method as recited in claim 1, wherein the plurality of virtual channels comprises a posted commands virtual channel, a non-posted commands virtual channel, and a response virtual channel.

9. The method as recited in claim 8, wherein the plurality of virtual channels comprises a probe virtual channel.

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10. The method as recited in claim 3, further comprising:

determining if the second packet is configured to push a posted request packet, and, if so,

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locating in the posted commands buffer a stored posted request packet generated by a same source that generated the second packet; and

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transmitting the located stored posted request packet to a second node prior to processing the second packet.

11. A computer system, comprising:

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a first node configured to transmit packets on a plurality of virtual channels;

and

a second node coupled to receive the packets from the first node on the plurality of virtual channels, wherein the second node comprises a plurality of

packet buffers, each packet buffer being allocated to a particular virtual channel, and wherein the second node is configured to store each received packet in one of the packet buffers allocated to the particular virtual channel on which the respective packet is received.

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12. The computer system as recited in claim 11, wherein the first node is configured to transmit a posted request packet on a posted command virtual channel, and the second node is configured to store the first packet in a posted commands packet buffer.

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13. The computer system as recited in claim 12, wherein the first node is configured to transmit a second packet to the second node on a second virtual channel other than the posted command virtual channel, and the second node is configured to store the second packet in a packet buffer other than the posted commands packet buffer.

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14. The computer system as recited in claim 13, further comprising a third node coupled to receive packets from the second node on the plurality of virtual channels, the third node comprising a second plurality of packet buffers, each of the second plurality of packet buffers allocated to a particular virtual channel, and wherein the second node is configured to transmit the second packet to the third node based upon availability of one of the second plurality of packet buffers allocated to the second virtual channel.

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15. The computer system as recited in claim 12, wherein the posted request packet comprises a posted write packet specifying a corresponding data packet.

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16. The computer system as recited in claim 15, wherein the second plurality of packet buffers comprises a posted command data buffer allocated to the posted command virtual channel, and wherein the second node is configured to store the data packet in the posted command data buffer upon receipt thereof from the first node.

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17. The computer system as recited in claim 13, wherein the second packet is configured to push a posted request packet, and wherein the second node is configured to search the posted commands packet buffer for a stored posted request packet generated by a same source that generated the second packet, and to transmit the stored posted request packet to a third node prior to processing the second packet.

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18. The computer system as recited in claim 11, wherein the plurality of virtual channels comprises a posted commands virtual channel and a non-posted commands virtual channel.

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19. The computer system as recited in claim 18, wherein the plurality of virtual

channels further comprises a response virtual channel.

20. The computer system as recited in claim 19, wherein the plurality of virtual
5 channels further comprises a probe virtual channel.

21. A method for routing packets among a plurality of nodes in a computer
system, comprising:

10 generating a posted request packet in a first node of the plurality of nodes;

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transmitting a plurality of packets, including the posted request packet, from
15 the first node via a plurality of virtual channels, each of the plurality of packets
being transmitted via a particular virtual channel, wherein the posted request packet
is transmitted to a second node on a posted command virtual channel dedicated to
posted request packets, and wherein the posted request packet is transmitted
independently of other of the packets transmitted on other of the virtual channels.

20 22. The method as recited in claim 21, wherein the second node comprises a
plurality of packet buffers including a posted command packet buffer, each packet buffer
being allocated to a particular virtual channel of the plurality of virtual channels, and

wherein transmitting the second packet to the second node is dependent upon availability of the posted command packet buffer.

5 23. The method as recited in claim 22, comprising:

storing the posted request packet in the posted command packet buffer in the
second node upon receipt thereof.

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24. The method as recited in claim 21, wherein the first node comprises a plurality of packet buffers allocated among the plurality of virtual channels, the method comprising:

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generating a second packet in the first node, the second packet being configured to generate a response packet from a target node;

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allocating one of the packet buffers to receive the response packet, the allocated packet buffer being allocated to a response virtual channel which is one of the plurality of virtual channels; and

transmitting the second packet to the target node.

25. The method as recited in claim 21, wherein the first node comprises a

plurality of command buffers and a plurality of data buffers allocated among the plurality of virtual channels, the method comprising:

5 receiving, at the first node, a packet via a first virtual channel other than the posted command virtual channel;

determining whether the received packet specifies a corresponding data packet; and, if so,

10 allocating one of the data buffers allocated to the first virtual channel to store the corresponding data packet; and

15 storing the corresponding data packet in the allocated data buffers upon receipt thereof at the first node.

26. The method as recited in claim 25, comprising:

20 determining a destination node for the received packet, the destination node including a plurality of command buffers and a plurality of data buffers allocated among the plurality of virtual channels;

determining availability of one of the command buffers and one of the data buffers allocated to the first virtual channel; and

transmitting, on the first virtual channel the received packet and the corresponding data packet to the destination node dependent upon the determined availability.

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27. A computer system, comprising:

a first node configured to transmit a plurality of packets via a plurality of virtual channels, the first node configured to generate and transmit a posted request packet via a posted command virtual channel of the plurality of virtual channels, the first node configured to transmit the posted request packet independently of transmitting other of the plurality of packets via other of the plurality of virtual channels; and

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a second node coupled to receive the posted request packet.

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28. The computer system as recited in claim 27, wherein the second node comprises a plurality of packet buffers allocated among the plurality of virtual channels, and wherein the first node is configured to transmit the posted request packet to the second node dependent upon an available packet buffer of the plurality of packet buffers in the second node which is allocated to the posted command virtual channel.

29. The computer system as recited in claim 28, wherein the second node is configured to stored the posted request packet in the available packet buffer upon receipt thereof.

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30. The system as recited in claim 27, wherein the first node comprises a plurality of packet buffers allocated among the plurality of virtual channels, and wherein the first node is configured to generate a second packet, the second packet being configured to generate a response packet from a target node, and wherein the first node is configured to allocate one of the packet buffers to receive the response packet prior to transmitting the second packet to the target node, the allocated packet being allocated to a response virtual channel which is one of the plurality of virtual channels.

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31. The system as recited in claim 27, wherein the first node comprise a plurality of command buffers and a plurality of data buffers allocated among the plurality of virtual channels, and wherein the first node is configured to:

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determine whether a packet received on a first virtual channel other than the posted command virtual channel specifies a corresponding data packet;

allocate one of the data buffers allocated to the first virtual channel to store the corresponding data packet; and

store the corresponding data packet in the allocated data buffer upon receipt thereof.

5 32. The system as recited in claim 21, wherein the first node is configured to:

10 ~~determine a destination node for the received packet, the destination node comprising a plurality of command buffers and a plurality of data buffers allocated among the plurality of virtual channels;~~

~~determine availability of one of the command buffers and one of the data buffers at the destination node, which are allocated to the first virtual channel; and~~

15 ~~transmit, on the first virtual channel, the received packet and the corresponding data packet to the destination node dependent upon the determined availability.~~